

	Type	L #	Hits	Search Text
1	BRS	L1	66	plate adj modulation
2	BRS	L2	330268	amplifier
3	BRS	L3	9	1 with 2
4	BRS	L4	15	1 same 2
5	BRS	L5	3313	(am or (amplitude adj modulation)) with amplifier
6	BRS	L6	581	455/127.2-127.3,108.ccls.
7	BRS	L7	92	5 and 6

	DBs	Time Stamp	Comments	Error Definition
1	USPAT; US-PGPUB	2004/05/22 06:58		
2	USPAT; US-PGPUB	2004/05/22 06:58		
3	USPAT; US-PGPUB	2004/05/22 06:58		
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5	USPAT; US-PGPUB	2004/05/22 07:02		
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7	USPAT; US-PGPUB	2004/05/22 07:03		

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US006256482B1

(12) **United States Patent**
Raab

(10) Patent No.: **US 6,256,482 B1**
(45) Date of Patent: **Jul. 3, 2001**

(54) **POWER- CONSERVING DRIVE-
MODULATION METHOD FOR ENVELOPE-
ELIMINATION-AND-RESTORATION (EER)
TRANSMITTERS**

(76) Inventor: **Frederick H. Raab**, Green Mountain
Radio Research Company, 50 Vermont
Avenue, Colchester, VT (US) 05446

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/055,165**

(22) Filed: **Apr. 4, 1998**

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1997.

(51) Int. Cl.⁷ **H04B 1/04**

(52) U.S. Cl. **455/108; 455/93; 455/102;
455/108; 455/127; 330/199; 330/200; 332/149;
332/159**

(58) Field of Search **455/108, 93, 102,
455/127; 332/149, 159, 151; 330/200, 199,
136, 110**

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Primary Examiner—Lee Nguyen

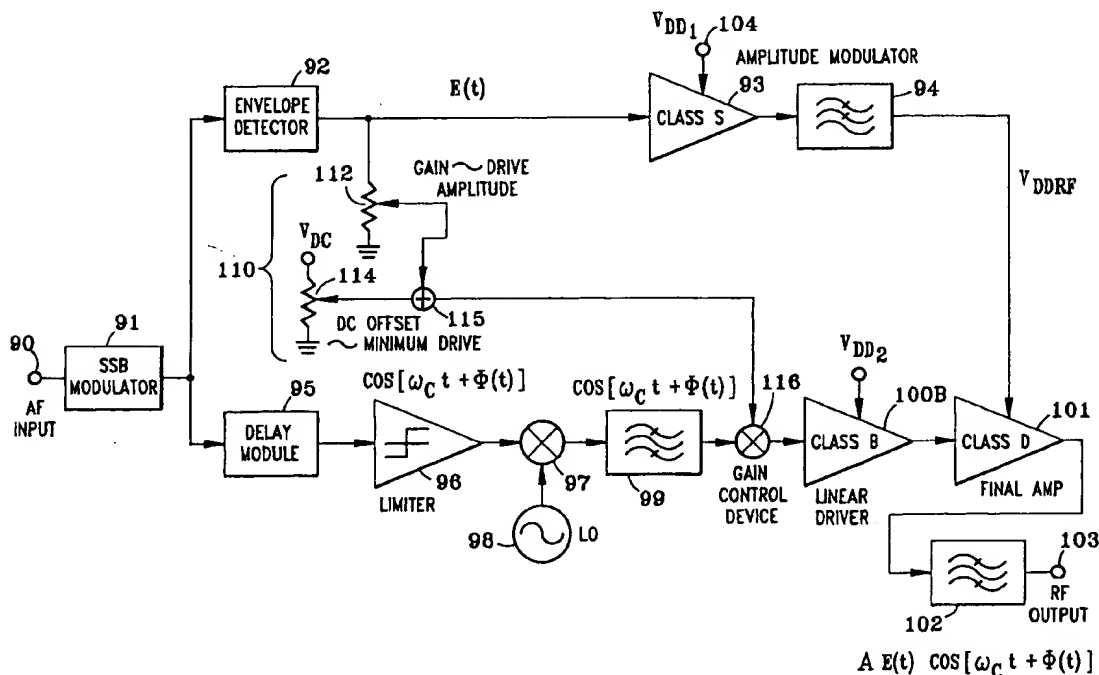
Assistant Examiner—Simon Nguyen

(74) Attorney, Agent, or Firm—Ted Touw

(57) ABSTRACT

A method and a circuit for high-efficiency linear RF-power amplification over a wide range of amplitudes from zero to peak output includes a final RF-power amplifier operating at or near saturation, an RF driver amplifier, a high-level amplitude modulator for the final amplifier, preferably a high-level amplitude modulator for the driver amplifier, and a means for determining the supply-voltage input to the final amplifier and for controlling the amplitude of the drive. The means for determining the supply-voltage input and for controlling the amplitude acts so that the final amplifier drive varies from a minimum level to peak as the desired transmitter output varies from zero to peak. The transmitter is preferably of the envelope-elimination-and-restoration type or the envelope-tracking type.

32 Claims, 13 Drawing Sheets





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(12) **United States Patent**
Camp, Jr. et al.

(10) **Patent No.: US 6,295,442 B1**
(45) **Date of Patent: Sep. 25, 2001**

(54) **AMPLITUDE MODULATION TO PHASE
MODULATION CANCELLATION METHOD
IN AN RF AMPLIFIER**

(75) Inventors: **Willam O. Camp, Jr.**, Chapel Hill;
Jeffrey A. Schlang, Raleigh; **Charles
Gore**, Durham, all of NC (US); **Jacob
Mannerstrale**, Eslöv (SE)

(73) Assignee: **Ericsson Inc.**, Research Triangle Park,
NC (US)

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(21) Appl. No.: **09/207,167**

(22) Filed: **Dec. 7, 1998**

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(52) U.S. Cl. **455/102; 455/108; 455/205**

(58) Field of Search **455/102, 108,
455/107, 110, 115, 141, 205**

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Primary Examiner—Daniel Hunter

Assistant Examiner—Thuan T. Nguyen

(74) *Attorney, Agent, or Firm*—Coats & Bennett

(57) **ABSTRACT**

An RF amplifier for a transmitter develops a phase modulation command representing a desired phase modulation of an RF signal, and an amplitude modulation command representing a desired amplitude modulation of the RF signal. An oscillator develops an RF input signal phase modulated based on the phase modulation command. A power amplifier receives the RF input signal and amplifies the RF input signal based on the amplitude modulation command to develop an RF output signal. A modulation control is operatively associated with the oscillator. The modulation control includes a phase memory for storing phase correction information correlating the amplitude modulation commands to a phase modulation error and a phase control for varying the phase modulation command based on the phase modulation error to correct for unintended phase errors created by amplitude modulation of the power amplifier.

26 Claims, 7 Drawing Sheets

